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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

DANG, THUAN D

ART UNIT PAPER NUMBER

1764

DATE MAILED: 03/16/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/722,790

Applicant(s)

NANDA, VIJAY

Examiner

Thuan D. Dang

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1764

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 February 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-24 and 29-34 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-24 and 29-34 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 11/25/03 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 7/6/05; 11/25/03.

- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

Claim 32 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. In claim 32, applicants claim the polyalkylated aromatic component from the alkylation effluent is re-supplied to the alkylation reaction zone so that the polyalkylated aromatic component is transalkylated. One having skill in the art would recognize that this cannot happen in an alkylation reactor if there is nothing else make this happen such as the presence of a transalkylation catalyst. Applicant can cancel the claim to overcome this rejection.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-24 and 29-34 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 1, the expression “second catalyst . . . having less catalytic activity than said first catalyst” is indefinite since it is unclear on which - conversion, producing by-products, cracking, . . . – this catalytic activity is based.

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Regarding claim 4, “the aging rate of the staged combination of the first and the second catalysts is less than the aging rate of either catalyst individually” is indefinite since the claim does not clarify under which condition this parameter is compared.

Regarding claims 13-16, the expression “at the operating conditions of the first bed” is used for comparing the activity of the first and the second catalysts makes the claims indefinite since it is while the second catalyst is placed in the second catalytic bed (not the first bed) which is operated under a condition different from the condition in the first bed. Applicants must specify under which condition, the activity of each of these different catalysts is compared.

Regarding claim 17, the arrangement/sequence of the first and second catalyst in the reactor must be clarified.

Regarding claims 23 and 24, the expression “at the operating conditions of the first bed” is used for comparing the activity of the first and the second catalysts makes the claims indefinite since it is while the second catalyst is placed in the second catalytic bed (not the first bed) which is operated under a condition different from the condition in the first bed. Applicants must specify under which condition, the activity of each of these different catalysts is compared.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-18, 21-24, 29-31, and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Merrill et al (6,057,485).

Merrill discloses a process of a gas phase alkylation of an aromatic hydrocarbon such as benzene with ethylene to produce ethylbenzene in a series of alkylation beds. Merrill discloses clearly that these catalyst used in the beds have different activities (the abstract; col. 4, lines 21-35).

Merrill discloses using silicalite which is known to be a ZSM-5 zeolite. However, silicalite has a higher ratio of silica and alumina (col. 6, lines 43-45).

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As discussed in the above 112, 2nd paragraph rejection, regarding claims 1 and 17, it is unclear what kind of activity applicant intends to claim in claim 1 is and what the sequence/arrangement of the first and second catalyst in the series of alkylation beds applicant intends to claim is. The teaching on column 4, lines 4, lines 21-35 makes the Merrill process different from the claimed process.

Assuming arguendo that applicant intended to claim that the activity of the catalyst is the conversion of olefin as disclosed by Merrill on column 14, line 17-36 and that applicant intended to claim that the first catalyst is placed in the first reaction bed and the second catalyst is placed in the second catalyst in which the feed would go to the first bed before the second bed as called for in claim 17. In claim 1, applicant claims indefinite activities for the catalysts (see the above 112 rejection). In claim 17, applicant claim activities for ethylation of benzene which is similar to activity of conversion of ethylene in the Merrill process (col. 14, lines 30-31). Further, the arrange of catalysts having different activity of the process as called for claim 17 is not clarified as discussed in the above 112 rejection.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the Merrill process by arranging the different catalysts in the series of beds so that the first bed having a catalyst of higher activity than the later bed to arrive at the applicant's claimed process since as disclosed Merrill the arrangement of catalysts having different increasing activities is a preferred method (col. 6, line 17). It has been held that non-preferred embodiments can be indicative of obviousness. *Merch & Co. V. Biocraft Laboratories Inc.* 10 USPQ 2d 1843 (Fed. Cir. 1989); *In re Lamberti* 192 USPQ 278 (CCPA 1976); *In re Kohler* 177 USPQ 399 (CCPA 1973); *In re Mills* 176 USPQ 196 (CCPA 1972); *In*

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re Bozek 163 USPQ 545 (CCPA 1969); *In re Meinhardt* 157 USPQ 270 (CCPA 1968); *In re Boe* 148 USPQ 507 (CCPA 1976); *In re Nehrenberg* 126 USPQ 383.

The ratio of reactants can be found on column 8, lines 26-34.

The alpha value of the zeolite is related closely to the Al/Si ratio of the zeolite which is also related closely to the activity of the catalyst.

The properties of the combined catalysts and individual catalyst are inherent properties. Further, it is expected to be related to the condition in which catalyst(s) is/are employed.

In figure 3, we can find 4 different beds.

The crystal size can be found on column 9, lines 10-11.

The difference activity of the initial catalyst and the later catalyst must be selected to optimize the process.

The amount of the benzene distributed to beds must be selected to optimize the process since the concentration of the reactant is a parameter which must be selected.

Claims 19, 20, and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Merrill et al (6,057,485) in view of Buress (3,751,506).

Merrill discloses a process as discussed above.

Merrill discloses using a silicalite having Si/Al of less than about 200 and having silica and alumina as a binders for the initial catalyst and the later catalyst, correspondingly. However, Buress discloses a ZSM-5 having a formula as disclosed on column 2, lines 39-40 and a binder of silica or alumina as disclosed on col. 5, lines 34-40.

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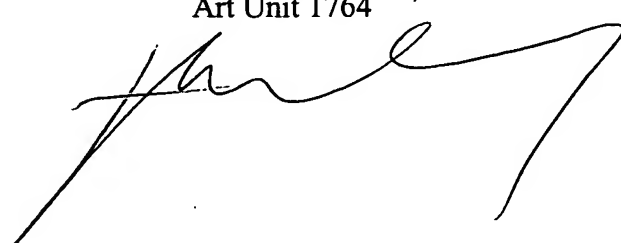
It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the Merrill process by using the Buess catalyst to arrive at the applicant's claimed process since the Buess process yield a high selectivity of desired alkylation product . Further, once silica or alumina are used as the binder for the first or second catalyst, they are expected to yield similar results since these materials as disclosed by Buess are equivalent binders for alkylation catalysts.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thuan D. Dang whose telephone number is 571-272-1445. The examiner can normally be reached on Mon-Thu.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola can be reached on 571-272-1444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Thuan D. Dang
Primary Examiner
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